

REMARKS

This is in response to the Office Action dated October 1, 2002. Claims 1, 3, 6, 12, 14 and 17 have been amended to further distinctly claim the subject matter without narrowing the scope thereof. The Applicant respectfully traverses rejections under 35 U.S.C. 103(a) according to the following remarks.

Rejection Under 35 U.S.C. 103(a)

Claims 1-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Pat. 6345502 to Tai et al. in view of US Pat. 5618379 to Armacost et al. and further in view of US Patent 6033582 to Lee et al.

Tai et al. teaches using parylene membranes along with micromachining of structure from various features (col. 1, lines 26-28). In col. 1, line 17-18, Tai et al. specifically discloses micromachining is the science of forming various features **on silicon structures**. However, there is no teaching or suggestion in Tai et al. that such micromachining can be used for forming features on a metal substrate. That is, Tai et al. fails to teach or even remotely suggest preparing a thin supported film on a **metal substrate** as claimed in Claims 1, 2 and 3.

In step (a) of Claim 1, the present application claims "masking off a first surface of the metal substrate with a maskant, **leaving a second surface of the metal substrate unmasked**. Tai et al. specifically teaches forming a maskant 102 on the front 101 and

a maskant 106 on the back of the silicon substrate 100 (col. 2, lines 4-8). Though the maskant 106 on the second surface is subsequently partly removed; the second surface is still partly masked by 106 throughout Figures 1A to 1F. Therefore, Tai et al. fails to teach "leaving a second surface of the metal substrate unmasked" as claimed.

Secondly, Tai et al. fails to teach placing the metal substrate under a vacuum as claimed in the step (b) in Claim 1.

Regarding step (c) of Claim 1, Tai et al. fails to teach "treating the unmasked second surface of the metal substrate by plasma etching". As both surfaces of the silicon substrate 100 are masked by maskants 102 and 106, completely or partly, at the time for performing anisotropic etching 110 as shown in Figure 1B, Tai et al. fails to teach **treating the unmask second surface** by plasma etching.

Regarding step (d) of Claim 1, Tai et al. fails to teach coating the treated second surface of the metal substrate with a film **while still under vacuum**. Further, as Tai et al. fails to teach placing the metal substrate under a vacuum, Tai et al. consequently fails to teach removing the metal substrate from the vacuum as claimed in step (e).

Regarding step (f) and (g) of Claim 1, Tai et al. teaches forming a **parylene** layer 122 and 124 **on the entire front and back** of the silicon substrate 100 **after the maskant 102 is removed**

(Figure 1C and col. 2, lines 19-24). Therefore, if the back of the silicon substrate 100 is construed as the second surface treated with the plasma etching, Tai et al. then teaches removing the maskant from the first surface **before** forming the film on the treated second surface; and therefore, fails to teach "removing the maskant from the first surface **after** forming the film" as claimed in step (f). Consequently, Tai et al. further fails to teach forming a photoresist layer on the first surface exposing a part of the first surface of the substrate as claimed in Claim (g). In contrast, if the front of the silicon substrate 100 is construed as the second surface, none of the steps (a) to (i) in Claim 1 has been disclosed by Tai et al. since the first surface (the back) is never unmasked (always masked by 106).

Regarding Claim 1, the Office Action indicates that Tai et al. teaches the layer 106 as the photoresist layer as claimed in Claim 1, and the silicon substrate 100 is etched through using such photoresist layer 106 as a mask. Under such circumstance, Tai et al. fails to teach "removing the photoresist layer" for the layer 106 is never removed by being covered with the layer 132 subsequently.

Therefore, Tai et al. fails to teach every steps as claimed in Claim 1.

Lee et al. teaches using static masks to protect the areas that are not to be etched; however, Lee et al. fails to

specifically teach steps (a) to (h).

Armacost et al. teaches the selective deposition of a polymer layer, however, fails to teach steps (a) to (h) as claimed in Claim 1.

As Tai et al., Lee et al., and Armacost et al., individually or in combination, fail to teach the steps as claimed in Claim 1, a prima facie case of obviousness is not established, and the rejection under 35 U.S.C. 103(a) is rejected.

Regarding Claim 12, Tai et al. teaches a silicon substrate 100, but fails to teach a metal substrate as claimed in step (a) of Claim 1 and Claims 13-14. In Fig. 1A and 1B, Tai et al. teaches completely masking off a front surface of the silicon substrate 100 with the maskant 102, and partly masking off the back surface with the maskant 106. Therefore, Tai et al. fails to teach "leaving a second surface unmasked as claimed in step (b) of Claim 1. Tai et al. fails to teach placing the metal substrate in a vacuum as claimed in step (c) of Claim 1. In Fig. 1B to 1C, Tai et al. teaches removing the maskant from the front surface, and forming parylene films on the front surface and the partly masked second surface. Further in col. 2, lines 18-24, Tai et al. disclosed "the silicon dioxide layer 102 is removed from the front layer. ... Parylene is deposited over the entire wafer front and back. This includes a deposition on the front surface 122 and a deposition 124 in the window area 110. Therefore, Tai et al. fails to teach steps (e) removing the metal substrate from the vacuum, and (f) removing

the maskant from the first surface **after** coating the film. Further, as the Office Action cited the anisotropic etching performed on the wafer back as the plasma etching step as claimed in step (c), the wafer front is thus the first surface masked with the maskant while performing the etching process. As Tai et al. does not disclose or suggest forming a photoresist layer on the wafer front, that is, the first surface, Tai et al. fails to teach the steps (g) to (i) as claimed in Claim 12.

Neither Lee et al. nor Armacost et al. teaches the steps (a) to (i) as claimed in Claim 12.

Regarding Claims 5-8 and 16-19, Tai et al., Lee et al. and Armacost et al., individually or in combination, fail to teach the maskant being made of a liquid film, resist and/or wax as claimed.

As Claims 4, 9-11, 15, 20-22 are in dependent nature of Claims 1 and 12 which are patentably distinguished over the cited references in the Office Action, Claims 4, 9-11, 15 and 20-22 are patentable.

In view of the foregoing, the application is believed to be in condition for allowance. Entry of the amendments and issuance of a Notice of Allowance is therefore respectfully requested. Should the Examiner have any suggestions for expediting allowance of the application, please contact applicant's representative at the telephone number listed below.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current Amendment. The


attached page is captioned "VERSION WITH MARKINGS TO SHOW CHANGES
MADE".

If any additional fee is required, please charge Deposit
Account Number 19-4330.

Respectfully submitted,

Date: 12/26/02

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Please amend page 2, third line of paragraph [0005] as:

"stainless steel, brass [copper], silicon, or other materials".

Please amend page 3, sixth line of paragraph [0012] as:

"suitable, for example, brass [copper], silicon, or other".

IN THE CLAIMS:

1. (Once Amended) A method for preparing a thin supported film on a metal substrate having two opposing surfaces, the method comprising:

a. masking off a first surface of the metal substrate with a maskant, leaving a second surface of the metal substrate unmasked;

b. placing the metal substrate under a vacuum;

c. treating the unmasked second unmasked surface of the metal substrate by plasma etching;

d. coating the treated second surface of the metal substrate with a film while still under vacuum;

e. removing the metal substrate from the vacuum;

f. removing the maskant from the first surface
after the treated second surface is coated with the film;

g. ~~treating the previously masked second surface of the metal substrate with photo resist~~ forming a photoresist on the first surface from which the maskant is removed, the photoresist exposing a part of the first surface of the substrate;

h. ~~exposing the treated second surface of the metal substrate with photo resist to artwork of a desired pattern~~ etching through the part of the substrate of which the first surface is exposed by the photoresist;
and

i. ~~exposing the metal substrate to a suitable solution~~ removing the photoresist.

j. ~~creating at least one etched part of the metal substrate by chemically etching in areas selectively exposed by the artwork;~~

k. ~~neutralizing the metal substrate, and~~

l. ~~removing the at least one etched part of the metal substrate.~~

3. (Once Amended) The method of Claim 1, wherein the metal substrate is brass ~~copper~~.

6. (Once Amended) The method of Claim 1, wherein the maskant is made from liquid film.

12. (Once Amended) A thin supported film on a metal

substrate having two opposing surfaces created by a method comprising:

- a. masking off a first surface of the two opposing surfaces with a maskant, leaving a second surface of the two opposing surfaces unmasked;
- b. placing the metal substrate under a vacuum;
- c. treating the unmasked second unmasked surface of the metal substrate by plasma etching;
- d. coating the treated second surface of the metal substrate with a film ~~while still under vacuum~~;
- e. removing the metal substrate from the vacuum;
- f. removing the maskant from the first surface after coating the second surface with the film;
- ~~g. treating the previously masked second surface of the metal substrate with photo resist, forming a photoresist layer on the first surface to expose a desired pattern of the first surface;~~
- ~~h. exposing the second surface of the metal substrate treated with photo resist to artwork of a desired pattern, removing the desired pattern of the first surface; and~~
- i. ~~exposing the metal substrate to a suitable solution, removing the photoresist layer from the first~~

surface.

~~j. creating at least one etched part of the metal substrate by chemically etching in areas selectively exposed by the artwork,~~

~~k. neutralizing the metal substrate, and~~

~~l. removing the etched parts from the metal substrate.~~

14. (Once Amended) The thin-supported film on the substrate of Claim 12, wherein the metal substrate is brass copper.

17. (Once Amended) The thin-supported film on the substrate of Claim 12, wherein the metal substrate is made from liquid film.